

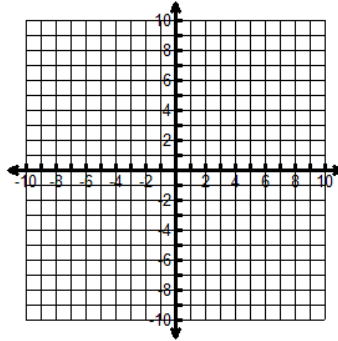
4.9

Graphs of Rational Functions

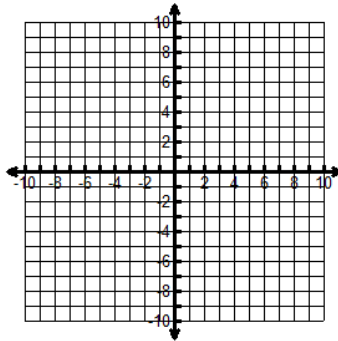
Name _____ Date _____ Period _____

Find the domain of each function algebraically. Graph the function and use limits to describe the behavior at the vertical asymptotes. Show work!

1. $f(x) = \frac{1}{x+2}$



2. $f(x) = \frac{-1}{x^2 - 25}$



How are the vertical asymptotes related to the domain of the function?

Describe how the graph of the given function can be obtained by transforming the reciprocal function

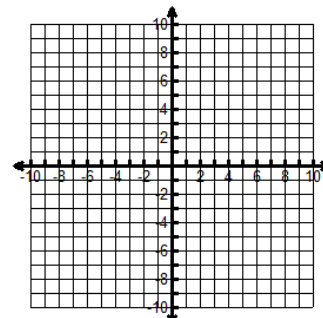
$g(x) = \frac{1}{x}$. (Use long division if necessary.) Identify the horizontal and vertical asymptotes and use limits to describe the behavior at the asymptotes. Sketch the graph of the function.

3. $f(x) = \frac{1}{x-2}$

Transformation(s):

Asymptotes:

Asymptote behavior:

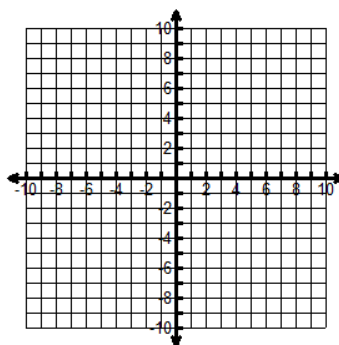


$$4. f(x) = \frac{5x-2}{x+1}$$

Transformation(s):

Asymptotes:

Asymptote behavior:

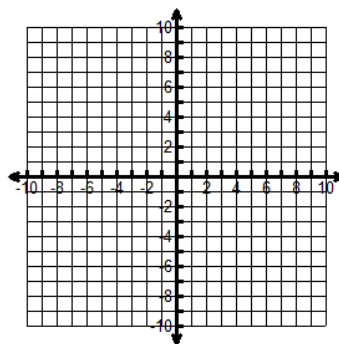


$$5. f(x) = \frac{-2}{x+4}$$

Transformation(s):

Asymptotes:

Asymptote behavior:

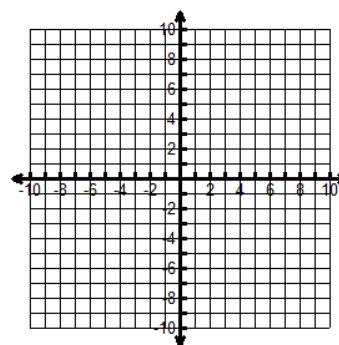


$$6. f(x) = \frac{3-x}{x+3}$$

Transformation(s):

Asymptotes:

Asymptote behavior:



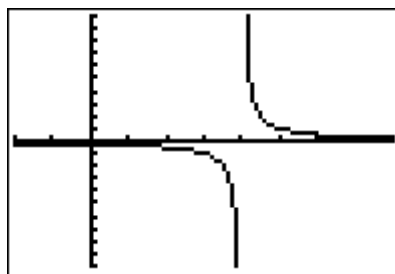
Evaluate the limit based on the graph of f shown.

$$7. \lim_{x \rightarrow 4^+} f(x) =$$

$$8. \lim_{x \rightarrow 4^-} f(x) =$$

$$9. \lim_{x \rightarrow \infty} f(x) =$$

$$10. \lim_{x \rightarrow -\infty} f(x) =$$



Find the horizontal and vertical asymptotes of the given function algebraically. Show work!

11. $f(x) = \frac{3x^2 - 1}{x^2 + 2}$

12. $f(x) = \frac{2x^2}{x^2 + 3}$

13. $f(x) = \frac{x - 3}{x^2 - 2x + 1}$

14. $f(x) = \frac{x - 1}{x^2 + 4x}$

Find the domain, range, asymptotes and intercepts of each function and then graph the function.

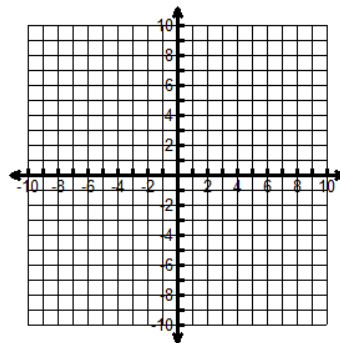
15. $f(x) = \frac{x - 7}{x^2 - 4x - 21}$

Domain:

Range:

Asymptotes:

Intercepts:



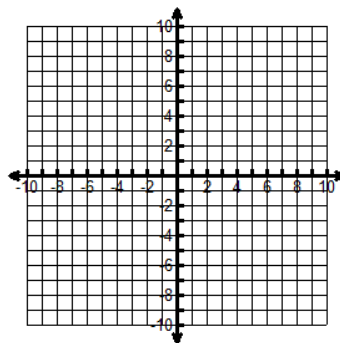
16. $f(x) = \frac{x + 4}{x^2 - 2x - 24}$

Domain:

Range:

Asymptotes:

Intercepts:



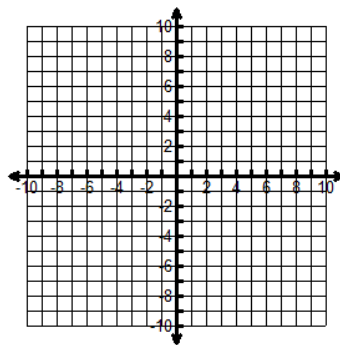
$$17. f(x) = \frac{x^2 + x - 30}{3x^2 - 3}$$

Domain:

Range:

Asymptotes:

Intercepts:



$$18. f(x) = \frac{2x^2 - 9x + 4}{x^2 - 7x + 10}$$

Domain:

Range:

Asymptotes:

Intercepts:

